



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/065,762

11/15/2002

Wei-Pin Chen

JCLA8424

9203

23900

7590

03/20/2008

J C PATENTS, INC.
4 VENTURE, SUITE 250
IRVINE, CA 92618

EXAMINER

NICKERSON, JEFFREY L

ART UNIT

PAPER NUMBER

2142

MAIL DATE

DELIVERY MODE

03/20/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/065,762	Applicant(s) CHEN ET AL.	
	Examiner JEFFREY NICKERSON	Art Unit 2142	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 November 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 November 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This communication is in response to Application No. 10/065,762 filed on 15 November 2002. Claims 1-20 have been examined.

Specification

2. The disclosure is objected to because of the following informalities: incorrect grammar. [0023] of the applicant submitted specification contains the phrase "Step S240, when the write complete flag of the message row pointed to the read pointer", which is slightly misleading. It should be changed to "Step S240, when the write complete flag of the message row pointed to **by** the read pointer". Appropriate correction is required.

Drawings

Figure 1 is objected to under 37 CFR 1.84(i) because the text is not oriented properly. See the last sentence of section i. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be

necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. **The objection to the drawings will not be held in abeyance.**

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Claims 1-8 and 14-20 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Regarding claims 1 and 14, computer-related inventions whether descriptive or functionally descriptive material are non-statutory categories when claimed as descriptive material *per se* (see *Warmerdam*, 33 F.3d at 1360 USPQ2d at 1759), falling under the "process" category (i.e. inventions that consist of a series of steps or acts to be performed). See 35 U.S.C. 100(b) ("The term process means, art, or method, and includes a new or a known process, machine, manufacture, composition of matter or material"). Functional descriptive material: "data structures" representing descriptive

Art Unit: 2142

material *per se* or computer program representing computer listing *per se* (i.e. software *per se*) when embodied in a computer-readable media are still not statutory because they are not capable of causing functional change in the computer. However, a claimed computer-readable *storage* medium encoded with a data structure, computer listing or computer program, having defined structural and functional interrelationships between the data structure, computer listing or computer program and the computer software and hardware component, which permit the data structure's, listing or program's functionality to be realized, is statutory (see MPEP §2106). In the instant case the applicant is making claim to a message transmitting queue which, as described in the disclosure, could be entirely software based.

Regarding claims 2-8 and 15-20, these claims inherit the rejection of their parent claims for reasons stated above.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 3, 7-9, 11-14, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawauchi (US 5,619,653), and further in view of Nanba (US 4,665,484) and Fujimoto (US 5,418,913).

Regarding claim 1, Kawauchi teaches a message transmitting queue (Kawauchi: abstract specifies a data buffer device), for transmitting a plurality of messages between a source and destination, comprising:

a plurality of messages rows (Kawauchi: Figure 3 depicts multiple data columns), for storing the messages that the source intends to transmit to the destination (Kawauchi: abstract), each of the message rows at least comprising a write complete flag (Kawauchi: abstract specifies write attribute flags);

a write control unit (Kawauchi: Figure 3, item 110 depicts the buffer controller), coupled to the source and the plurality of message rows (Kawauchi: Figure 3, see also col 4, lines 3-17), used to sequentially output a plurality of free message row addresses (Kawauchi: Figure 3; col 4, lines 3-17 specifies that the write pointer sequentially acquires buffer addresses), wherein when the message transmitting queue still has a free message row, the source controller reads an address of the message row that is currently free among said plurality of message rows (Kawauchi: Figure 3; col 4, lines 3-17; col 4, lines 45-58 specifies it does not use addresses if they've already been written to), and when the source completes writing the message of the message row that is currently free, the write complete flag of the message row that is currently free is set

(Kawauchi: Figure 3, col 4, lines 3-17; col 4, lines 45-58 specifies the write attribute bit is flagged once writing is complete), and when the message transmitting queue has no free message row, said write control unit outputs a non-free message row signal (Kawauchi: Figure 3, item 100; col 3, lines 31-57 specify there is a “reception ready” signal for the buffer device, equivalent to a NOT “not free address” signal and used for the same purpose);

and a read control unit (Kawauchi: Figure 3, item 110 depicts the buffer controller), coupled to the destination and the plurality of message rows (Kawauchi: Figure 3; see also col 3, lines 23-57), to sequentially read the message of the message row when the write complete flag is set, wherein after the destination reads the message, the write complete flag of the message row is cleared (Kawauchi: col 5, lines 22-35).

Kawauchi does not teach the use of a distribution complete flag, retrieving addresses based on the distribution complete flag, setting the distribution flag once the address has been retrieved, and clearing the distribution complete flag. Nor does Kawauchi teach informing the destination when the data is ready to be read.

Nanba, in a similar field of endeavor, teaches the use of a distribution complete flag, retrieving addresses based on the distribution complete flag, setting the distribution flag once the address has been retrieved, and clearing the distribution complete flag. (Nanba: col 1, lines 17-45 specifies a test and set instruction, which uses a lock control flag on shared memory).

Nanba does not teach informing the destination when the data is ready to be read.

Fujimoto, in a similar field of endeavor, teaches informing the destination when the data is ready to be read (Fujimoto: Figure 4, "Receiver's Identity" rows; Figure 6, item 110; col 13, lines 22-46 specifies an interrupt is sent to the processor associated with the queue so it can start reading).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the teachings of Nanba for using a test and set instruction and the teachings of Fujimoto for sending interrupts to receiving processors. The teachings of Nanba and Fujimoto, when implemented in the Kawauchi system, will allow one of ordinary skill in the art to handle multithreaded writes to shared memory and allow for organized reading from destination controllers by using interrupts. One of ordinary skill in the art would be motivated to utilize the teachings of Nanba and Fujimoto in the Kawauchi system in order to prevent race conditions during writing to shared memory by multiple threads and allow efficient reading of a queue from multiple processors by using interrupts.

Regarding claim 3, the Kawauchi/Nanba/Fujimoto system teaches wherein the read control unit comprises:

a read pointer control unit, to store a read address of the message transmitting queue (Kawauchi: Figure 3, item 103), wherein when the destination controller completes reading the message of the message row pointed to by the read address,

Art Unit: 2142

said read pointer control unit clears the distribution complete flag and the write complete flag of the message row (Kawauchi: col 5, lines 22-35; Nanba: col 1, lines 17-45), and progresses the read address (Kawauchi: abstract specifies reading is sequential);

a read buffer, coupled to the read pointer control unit and the plurality of message rows, to temporarily store the message of the message row pointed to by the read address (Fujimoto: Figure 10, items 115 provides the receiving processor is storing the message);

and a read request multiplexer, coupled to the read pointer control unit and the write complete flags of the plurality of message rows, to output the read request according to the write complete flag of the message row pointed to by the read address (Fujimoto: col 1, line 50 – col 2, line 6 specifies that obtaining read pointer address from flag status in a queue is well known in the art).

Regarding claim 7, the Kawauchi/Nanba/Fujimoto system teaches wherein the source is a central processing unit (Fujimoto: Figure 1a, item 1 and Figure 9, items 114).

Regarding claim 8, the Kawauchi/Nanba/Fujimoto system teaches wherein the destination is a central processing unit (Fujimoto: Figure 1a, item 2 and Figure 9, items 114).

Regarding claim 9, this method claim comprises limitations corresponding to that of claim 1 and the same rationale of rejection is used, where applicable. And wherein the

Art Unit: 2142

rows are referenced with read and write pointers (Kawauchi: Figure 3, item 102; Figure 3, item 103).

Regarding claim 10, the Kawauchi/Nanba/Fujimoto system teaches wherein when the write pointer is progressed and points to a message row whose distribution complete flag is set, a not free message row signal is asserted to inform the source controller.

Regarding claim 11, this method claim comprises limitations corresponding to that of claim 7 and the same rationale of rejection is used, where applicable.

Regarding claim 12, this method claim comprises limitations corresponding to that of claim 8 and the same rationale of rejection is used, where applicable.

Regarding claim 13, the Kawauchi/Nanba/Fujimoto system teaches wherein the read request is an interrupt request of the CPU (Fujimoto: col 13, lines 22-46 specifies an interrupt is sent to the processor associated with the queue so it can start reading).

Regarding claim 14, this message transmitting queue claim comprises limitations corresponding to that of claim 9 and the same rationale of rejection is used, where applicable.

Art Unit: 2142

Regarding claim 19, this message transmitting queue claim comprises limitations found in and corresponding to that of claim 9 and the same rationale of rejection is used, where applicable.

7. Claims 2, 10, 16-18, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawauchi (US 5,619,653), Nanba (US 4,665,484), and Fujimoto (US 5,418,913), and further in view of Fried et al (US 5,142,676).

Regarding claim 2, the Kawauchi/Nanba/Fujimoto system teaches wherein the write control unit comprises:

a write pointer control unit (Kawauchi: Figure 3, item 102), for storing a write address of the message row that is currently free (Kawauchi: col 4, lines 3-17), wherein after the source controller reads the write address of the message row that is currently free, said write pointer control unit sets the distribution complete flag of the message row that is currently free (Nanba: col 1, lines 17-45 specifies a test and set instruction, which uses a lock control flag on shared memory), and progresses the write address of the message row that is currently free (Kawauchi: col 4, lines 3-17 provide the write addresses are progressed sequentially), and when the source controller completes writing the message of the message row, sets the write complete flag of the message row (Kawauchi: col 4, lines 46-58 specifies changing the write data attribute flag after writing data);

The Kawauchi/Nanba/Fujimoto system does not teach a distribution complete flag multiplexer or a distribution address multiplexer.

Fried, in a similar field of endeavor, teaches:

a distribution complete flag multiplexer (Fried: Figure 2, item 62), coupled to the write pointer control unit (Fried: Figure 3, item 85; col 6, lines 24-39) and the distribution complete flags of the plurality of message rows, (Fried: Figure 2, items 58; col 5, lines 28-33) to output a not-distributed signal (Fried: NOT FOUND signal) according to the distribution complete flag of the message row pointed to by the write address (Fried: col 7, lines 37-63 specifies that if a shared memory row has been already locked, a NOT FOUND signal is used to indicate the row can't be accessed);

and a distribution address multiplexer (Fried: Figure 3, items 102, 104, 106; col 7, lines 20-36), coupled to the distribution complete flag multiplexer and the write pointer control unit, to output the affirmative of the write address and the no free message row signal according to the not-distributed signal (Fried: col 7, lines 20-63 specify that when it is determined the segment address has not been locked, then the LOCK signal is applied to lock the segment and then the segment is written to; and when it is determined the segment address has been locked the DISALLOW signal is asserted; See also col 6, lines 24-66).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the teachings of Fried for managing locked memory segments with NOT FOUND and DISALLOW signals. The teachings of Fried, when implemented in the Kawauchi/Nanba/Fujimoto system, will allow one of ordinary skill in

Art Unit: 2142

the art to identify memory segments of the queue between two processors that have been locked and disallow writing to locked segments while allowing locking and writing to unlocked segments. One of ordinary skill in the art would be motivated to utilize the teachings of Fried in the Kawauchi/Nanba/Fujimoto system in order to allow multiple processors to identify which memory segments are currently locked and which are available for locking and writing.

Regarding claim 10, this claim contains limitations found within and corresponding to claim 2 and the same rationale of rejection is applied, where applicable.

Regarding claim 16, this claim contains limitations found within and corresponding to claim 2 and the same rationale of rejection is applied, where applicable.

Regarding claim 17, this claim contains limitations found within and corresponding to claims 1 and 2 and the same rationale of rejection is applied, where applicable.

Regarding claim 18, the Kawauchi/Nanba/Fujimoto/Fried system teaches wherein when the source controller receives the no free message row signal, a request is issued to ask for the free message row from the message transmitting queue every predetermined period (Fried: col 3, line 64 – col 4, line 20 specifies if the requesting processor cannot access the memory address it will repeat its request after a certain amount of time).

Regarding claim 20, the Kawauchi/Nanba/Fujimoto/Fried system teaches wherein when the source controller receives a free message row address, a firmware records said free message row address till an associated message has been written to the free message row address completely (Fried: Figure 1, item 24 depicts the locked address memory table; col 3, lines 40-56 specify a table maintains locked memory addresses and the corresponding processor ID that locked them).

8. Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawauchi (US 5,619,653), Nanba (US 4,665,484), and Fujimoto (US 5,418,913), and further in view of Balmer et al (US 5,724,599).

Regarding claim 4, the Kawauchi/Nanba/Fujimoto system teaches wherein each message row comprises data the source intends to transmit to the destination (Kawauchi: abstract).

The Kawauchi/Nanba/Fujimoto system does not teach wherein the data is a command row and a data row.

Balmer, in a similar field of endeavor, teaches wherein the data can be an command (instruction) row and a data row (Balmer: Figure 2, items 11, 12, 13, 14).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the teachings of Balmer for splitting data into instruction rows and data rows. The teachings of Balmer, when implemented in the

Kawauchi/Nanba/Fujimoto system, will allow one of ordinary skill in the art to organize data sending from one processor to the next by splitting it into instructions and data.

One of ordinary skill in the art would be motivated to utilize the teachings of Balmer in the Kawauchi/Nanba/Fujimoto system in order to allow the receiving processor to easily identify which part of the message is an instruction and which part is data.

Regarding claim 5, the Kawauchi/Nanba/Fujimoto/Balmer system teaches wherein the size of the command row is four bytes (Balmer: col 10, line 52 – col 11, line 10 specify 32 bit instructions).

Regarding claim 6, the Kawauchi/Nanba/Fujimoto/Balmer system teaches wherein the size of the data row is a multiple of four bytes (Balmer: col 10, line 52 – col 11, line 10 specify data is stored in 32 bit words).

9. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kawauchi (US 5,619,653), Nanba (US 4,665,484), and Fujimoto (US 5,418,913), and further in view of IEEE (“1003.1 Standard for Information Technology – POSIX”; Base definitions, Issue 6; 6 December 2001).

Regarding claim 15, the Kawauchi/Nanba/Fujimoto system does not teach wherein the length of a message exceeds the atomic read/write size that can be processed by said controllers.

IEEE, in a similar field of endeavor, teaches wherein the length of a message exceeds the atomic read/write size that can be processed by said controllers (IEEE: pg 251, definition for {PIPE_BUF} provides that handling non-atomic writes due to excessive file size can be handled by any POSIX compatible OS, they just won't be atomic).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the teachings of IEEE for using atomic read/write operations under a certain size limit. The teachings of IEEE, when implemented in the Kawauchi/Nanba/Fujimoto system, will allow one of ordinary skill in the art to write messages over a certain size non-atomically. One of ordinary skill in the art would be motivated to utilize the teachings of IEEE in the Kawauchi/Nanba/Fujimoto system in order to comply with computing standards.

Cited Pertinent Prior Art

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- a. Bacon (US 6,247,025 B1) discloses a system that utilizes a lock/unlock bit and thread ID for controlling access to shared objects between threads.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JEFFREY NICKERSON whose telephone number is (571)270-3631. The examiner can normally be reached on M-Th, 8:30-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Caldwell, can be reached on 571-272-3868. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. N./
Jeffrey Nickerson
Examiner, Art Unit 2142

/Andrew Caldwell/
Supervisory Patent Examiner, Art Unit 2142